Understanding the People's Liberation Army Rocket Force

Strategy, Armament, and Disposition

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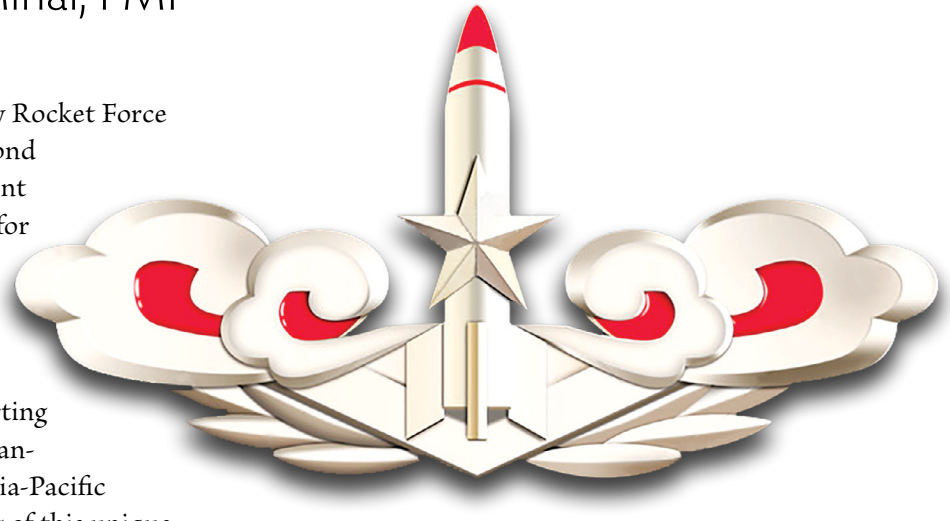

The People's Liberation Army Rocket Force (PLARF), formerly the Second Artillery Force, is the element of the Chinese military responsible for organizing, manning, training, and equipping the People's Republic of China's (PRC) strategic land-based nuclear and conventional missile forces as well as their supporting elements and bases. Any military planner involved in operations in the Asia-Pacific theater must have an understanding of this unique force as it presents a threat to its neighbors, specifically Taiwan, and maintains the ability to influence local, regional, and global military operations. The PLARF has been rapidly expanding and modernizing in recent years, concurrent with the PRC's evolving strategy regarding deterrence.

China's nuclear buildup is directly in line with the PRC's expanded view of the utility of nuclear weapons, and China's nuclear strategy is gradually evolving from a policy of minimal deterrence to a more active posture of limited deterrence.[1] While its nuclear arsenal is small compared to that of the United States, China fielded roughly 320 nuclear warheads as of 2020; China's nuclear arsenal is constantly upgrading, modernizing, and expanding.[2] Unconfirmed reports place China's nuclear arsenal as somewhat larger than it publicly claims; several conventionally armed ballistic missiles allegedly have nuclear variants that have never been officially confirmed.[3] However, these proposed nuclear variants may be disinformation or speculative.

Meanwhile, the conventional arm of the PLARF is the largest ground-based missile force in the world, with over 2,200 conventionally armed ballistic and cruise missiles and with enough antiship missiles to attack every U.S. surface combatant vessel in the South China Sea with enough firepower to overcome each ship's missile defense.[4] The elevation from Second Artillery Force to PLARF—that is, elevation to a full-service equivalent to the army, navy, and air force—is indicative of China's increased reliance on missile forces at the operational and strategic levels.

Identifying the strategy governing the employment of the PLARF and demonstrating China's history of proliferation will explain how the PLARF fits into China's overall strategic vision. Identifying each of PLARF's missile systems will chart the location of each of China's approximately forty missile brigades and their probable composition to the greatest extent possible. Some recommendations are necessary for planning against the PLARF; there are weaknesses inherent in its structure and technology as the formation currently exists.

Strategy

China's 2019 defense white paper identified that, while China has downsized the People's Liberation Army (PLA), it has expanded the PLARF because it "plays a critical role in maintaining China's national sovereignty and security."[5] Chinese leadership views the PLARF as a significant contribution to "strategic balance" between China and its main strategic competitors.[6] The PLARF fulfills several missions for China, including strategic deterrence, suppression of enemy air defenses, and "not allowing any inimical force access to Chinese space: land, air, or sea, and deny the enemy any space to fight a battle near the Chinese territory, including Taiwan and the first chain of islands [China's disputed island claims in the South China Sea]."[7] The PLARF's near-term objectives include "enhancing its credible and reliable capabilities of nuclear deterrence and counterattack, strengthening intermediate and long-range precision strike forces, and enhancing strategic counter-balance capability, so as to build a strong and modernized rocket force."[8] China is achieving these capabilities by simultaneously introducing new, more accurate nuclear missiles while drastically building up its conventional missile forces. Every year between 2002 and 2009, the PRC deployed approximately fifty to one hundred new ballistic missiles opposite Taiwan, with the number of missiles currently arrayed against Taiwan equaling at least one thousand.[9] Additionally, China is making great strides in enhancing the accuracy of its missiles, with the circular error probable (CEP) continuing to shrink. (The CEP is a measure of a weapon's precision; it is the radius of a circle in which 50 percent of rounds are expected to hit.) The CEP for China's first nuclear missile, the DF-3A, was four thousand meters, while its newest intercontinental ballistic missile (ICBM), the DF-41, has a CEP of one hundred to five hundred meters—conservatively, an 800 percent improvement.[10]

The PLARF's main focus is on Taiwan and the South China Sea, but it also maintains capabilities against the Korean Peninsula, India, Russia, and the United States. Although growing at a much more moderate pace compared to its conventional missile arm, the PLARF's nuclear forces have been expanding in recent decades and are on track to double in size by 2030.[11] Crucially, China's nuclear arsenal could now survive a first strike from either the United States or Russia with enough capability remaining to retaliate.[12]

The PLARF's capabilities are expanding to counter both Taiwanese and U.S. systems; China has focused on antiship ballistic missiles like the DF-17, DF-21, and DF-26 to counter U.S. carrier groups and deny U.S. access to the region via land, air, and sea in order to inhibit the U.S. ability to assist regional allies.[13] China's numerous short- and medium-range ballistic missiles are designed to overwhelm Taiwan's air defense, and China currently spends nearly twenty-four times what Taiwan does on defense.[14] With more accurate CEP of its missiles, the PLARF is better able to target "key strategic and operational targets of the enemy," including reconnaissance, intelligence, command and control, electronic warfare, antiair and logistics systems to disrupt enemy supply, logistics, and defenses in preparation for a land invasion.[15]

The direct impact of China's missiles is disturbing enough, but also troubling is China's willingness to share its missile technology with other nations. Pakistan in

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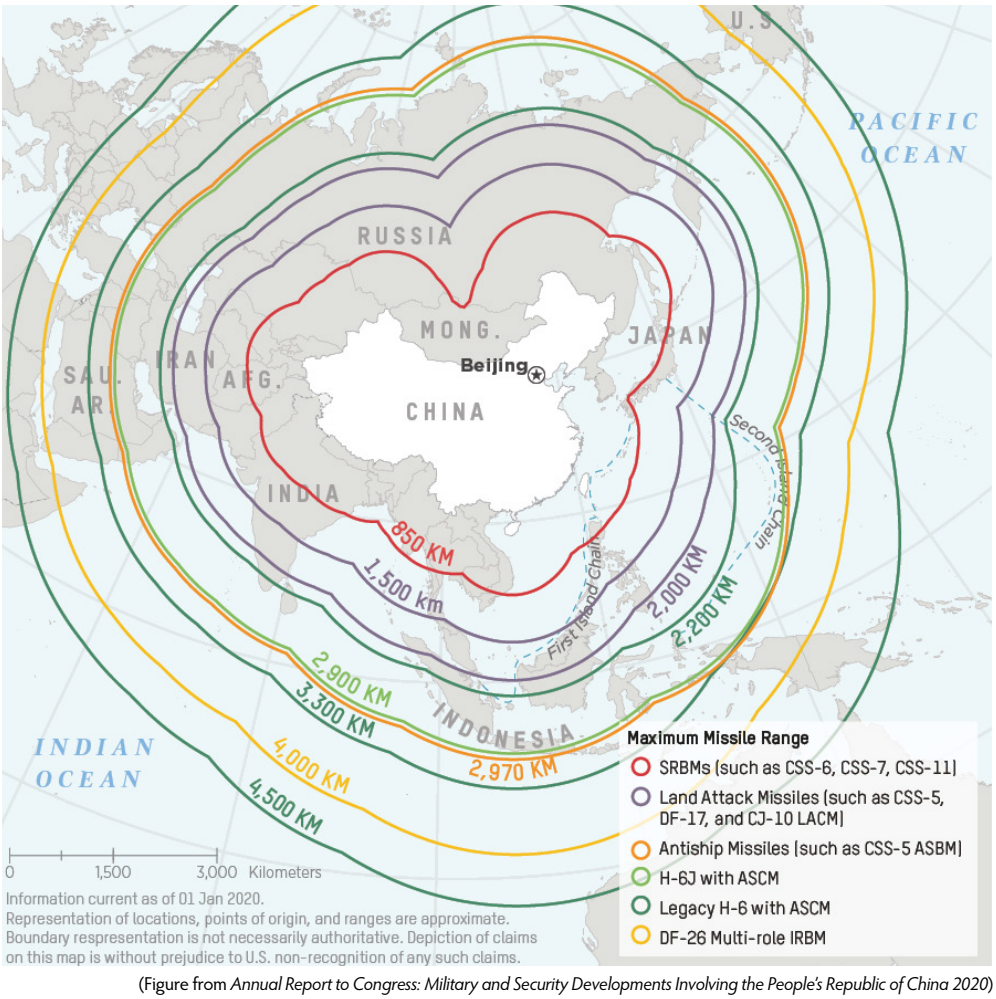


(Figure from *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*)

Figure 1. Short, Medium, and Intermediate Ballistic Missile Ranges

particular has benefited from this stance, with every Pakistani solid-fueled ballistic missile constructed with Chinese assistance since the early 1990s.[16] In 1981, China supplied Pakistan with CHIC-4 bombs—a potential delivery system for Pakistan's then nascent nuclear weapons program—and as much as fifty kilograms of highly enriched uranium, ten tons of natural uranium hexafluoride (a chemical compound that can be placed in centrifuges to produce highly enriched uranium for nuclear reactors or weapons), and five tons of UF_6 enriched to 3 percent, capable of producing uranium suitable for nuclear reactors.[17] Possessing a nuclear capability requires two distinct but vital programs—a program to construct a nuclear warhead, and a program to design a delivery system for a nuclear warhead. China has demonstrated willingness to assist other nations with both.

Armament

It is important to understand the varying missile systems fielded by the PLARF in order to devise adequate countermeasures. Each missile described below will include whether the missile is confirmed to be armed with a nuclear warhead, a conventional warhead, or if it is dual-capable; in other words, if there are conventional and nuclear variants of the same missile. China has an estimated 2,300–2,400 ballistic missiles in total, including about ninety ICBMs and approximately 320 nuclear warheads. More than half of China's nuclear capability resides in the PLARF; the rest are either stockpiled or launched from submarines, along with a handful of nuclear gravity bombs for the PLA air force, specifically for use by the H-6K bomber.[18]

Chinese missile nomenclature is relatively simple to follow. All ballistic missiles of the PLARF belong to the Dong Feng (East Wind) family of systems and possess the prefix "DF" in their designation, while cruise missiles belong to the Hong Niao/HN (Red Bird) or Chang Jian/CJ (Long Sword) family of missiles. In keeping with PLA deception tactics, the cruise missile CJ-10 has also been designated the Hong Niao-2/HN-2 to confuse intelligence analysis.

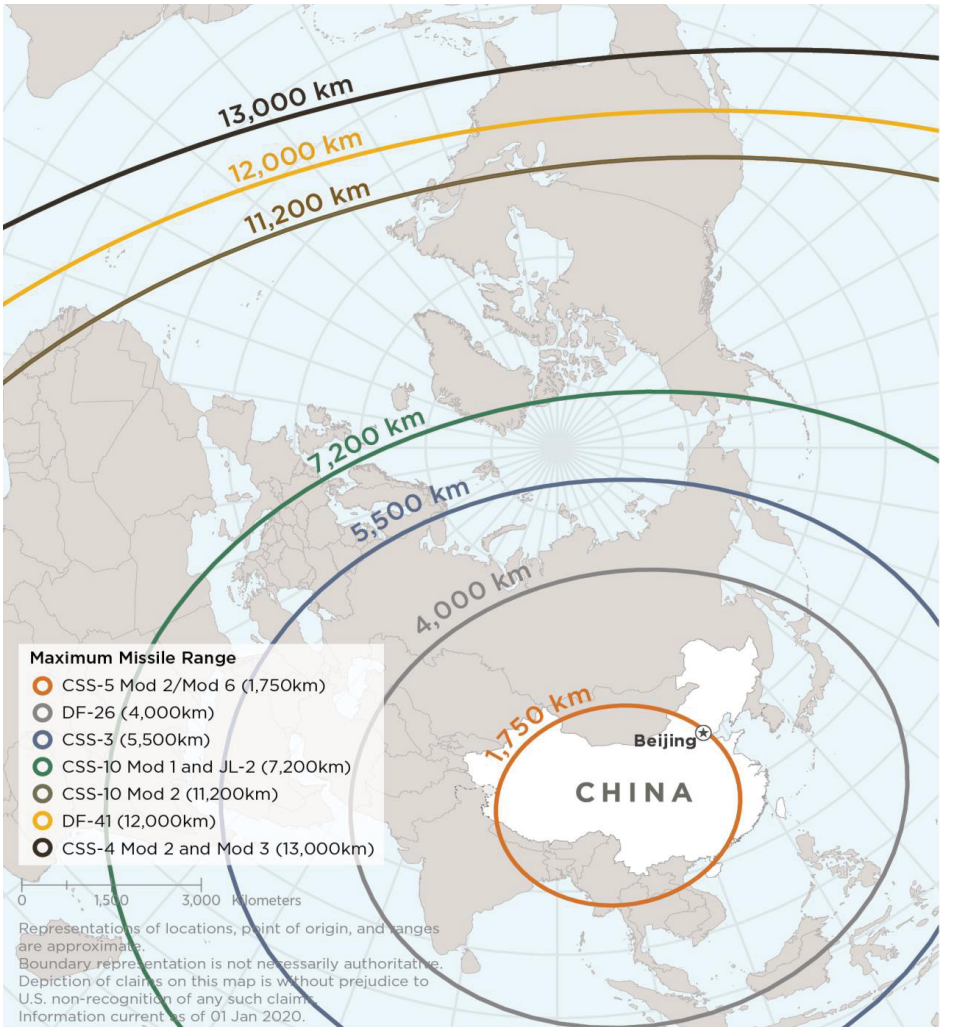
As the largest ground-based missile force in the world, the PLARF fields a wide variety of missile systems. Approximately half of these are short-range weapons

intended for use against Taiwan. Ground-based missiles fall into several categories based on type and range. PLARF missiles are organized into six classifications:

- Ground-launched cruise missile (GLCM)
- Hypersonic glide vehicle (HGV)
- Short-range ballistic missile (SRBM, range less than one thousand kilometers)
- Medium-range ballistic missile (MRBM, range between one thousand and three thousand kilometers)
- Intermediate-range ballistic missile (IRBM, range between three thousand and 5,500 kilometers)
- Intercontinental ballistic missile (ICBM, range greater than 5,500 kilometers)

For reference, figure 1 (on page 18) and figure 2 demonstrate range bands of many of China's missiles.[19] China's longest-range ICBMs—the DF-5A, DF-31A, and DF-41—could strike targets anywhere in the continental United States. Note that not all Chinese missiles belong to the PLARF; for instance, the DF-12 SRBM (also known as the M20 for the export version) may be used by the PLA and not the PLARF, as that weapon debuted in 2013 but has not been seen with any known PLARF units since.[20] The DF-12 may be based off of the B-611, a weapon system designed for the PLA to have integral long-range precision fires without the need to request theater PLARF forces.[21] The following missiles will be identified first by their Chinese designation and then by their Western designation, if applicable.

CJ-10 or HN-2. Previously referred to as the DH-10 until 2011, the CJ-10 is the only cruise missile in the PLARF arsenal; other Chinese cruise missiles are under the control of the PLA Navy or PLA Air Force.[22] As opposed to ballistic missiles, cruise missiles have a significantly lower trajectory and remain in the atmosphere for the duration of their flight time; this makes cruise missiles difficult to detect and intercept.[23] The CJ-10 is based off the Russian Kh-55, and purportedly, reverse-engineered U.S. Tomahawk technology.[24] The CJ-10 has a range of somewhat over 1,500 kilometers, an extremely accurate CEP of five meters, and while conventionally armed, it could potentially carry a



(Figure from *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*)

Figure 2. Intermediate and Intercontinental Ballistic Missile Ranges


DF-17
DF-17
DF-17
ZL105
ZL104


DF-26

nuclear warhead. These facts are mostly conjectural, and the total number of deployed CJ-10s is a mystery; the Department of Defense reported at least three hundred CJ-10 missiles as of 2020, but previous estimates vary from mid-two hundred to over five hundred missiles.[25] China has been extremely secretive regarding this weapons system, using numerous designations as well as intentional conflation with the DF-11 ballistic missile in numerous publications to further obfuscate the true nature of this system.[26] While China is no stranger to military deception, the deliberate attempts to hide the CJ-10's capabilities is unusual.

DF-4/CSS-3. A liquid-fueled ICBM carrying a 3.3-megaton nuclear warhead, the DF-4 is an older design that may be phased out in favor of the DF-31 or the DF-41. As is typical with older Chinese ICBMs, it is very inaccurate.[27] It is one of only two Chinese weapons systems with a megaton payload. The DF-4 is silo-based or cave-based, limiting its utility compared to the road-mobile ICBMs China has been recently fielding like the DF-31. As of 2020, there were only six DF-4s in the Chinese arsenal, further evidence the weapon is retiring.[28] As liquid-fueled missiles cannot store their fuel and thus must be fueled prior to use (a process that can take hours), liquid-fueled missiles are being retired in favor of solid-fueled missiles that can deploy instantly, increasing force readiness.

DF-5/CSS-4. Another liquid-fueled, silo-based ICBM, the DF-5 has much greater range than both the older DF-4 and new DF-31. The original DF-5, which is no longer deployed, could only carry a single one- to four-megaton warhead, while all three subvariants, the DF-5A, -5B, and -5C, are multiple independently targetable reentry vehicle (MIRV) capable. The DF-5A can carry three three-megaton warheads, the DF-5B can carry up to eight warheads, and the still-experimental DF-5C can carry up to ten warheads. The CEP of the newest variant is purportedly three hundred meters. Approximately ten of the DF-5 missiles currently operational are the DF-5A variant and ten are DF-5B variants.[29] The DF-5C is not currently deployed but may be in the near future.

DF-11/CSS-7. The DF-11 road-mobile, solid-fueled SRBM is the most numerous weapon system in the PLARF, with conservatively two hundred launchers and six hundred deployed missiles, and an upper estimate at over 750 missiles, with a range of six hundred kilometers.[30] China also has sold this weapon extensively to external markets as the M-11, with Pakistan, Myanmar, and Bangladesh confirmed to have purchased the missile.[31] Over one hundred of China's DF-11s have been upgraded to the DF-11A variant, while a bunker-buster variant designated DF-11AZT has also been unveiled.[32] Unconfirmed reports state that the DF-11 can carry small nuclear warheads of between two and twenty kilotons, or even a large, 350-kiloton warhead, but these speculations have never been confirmed and are not included in estimates of China's total nuclear forces.[33]

DF-15/CSS-6. A solid-fueled, road-mobile SRBM, the DF-15 has three variants: the DF-15A, -15B, and -15C. The DF-15 is conventionally armed but purportedly the DF-15A can carry a fifty- to 350-kiloton warhead.[34] The DF-15 is also very numerous, with several hundred missiles and at least one hundred launchers in total, although somewhat fewer total missiles than the DF-11.[35] The DF-15 has a range of six hundred kilometers, while the DF-15A has a range of nine hundred kilometers and the DF-15B eight hundred kilometers.[36] The DF-15C is an earth penetrator and has similar range to the -15A and -15B.

DF-16/CSS-11. The DF-16 is China's newest solid-fueled, road-mobile SRBM and may replace the older DF-11s and DF-15s in the years to come. It can carry up to three MIRV warheads, though the nuclear variant is unconfirmed as it is with other Chinese SRBMs. China had twelve DF-16s as of 2017 and has added a second brigade since, leading to probably twenty-four DF-16s as of 2020.[37]

DF-17 and DF-ZF. The DF-17 is a new solid-fueled, road-mobile IRBM. It shares some design aspects with the DF-16 but is most notable for its unique warhead, the DF-ZF. The DF-ZF is an HGV, a new type of warhead that combines elements of ballistic and cruise missiles, achieving supersonic speeds and thus immense

Top left: The Dongfeng-17 (DF-17), a hypersonic weapon used for precision strikes against medium and close targets, is displayed to the public for the first time 1 October 2019 during the National Day Parade in Beijing. (Screenshot of a China Global Television Network YouTube video)
Bottom left: A DF-26 medium-range ballistic missile displayed after a military parade commemorating the seventieth anniversary of the end of World War II 3 September 2015 in Beijing. (Photo courtesy of IceUnshattered via Wikimedia Commons)

kinetic energy. Powered by a scramjet, the DF-ZF can perform extreme evasive maneuvers to avoid enemy missile defense, unlike ballistic missiles that generally follow a predictable trajectory. Chinese commentators have stressed that the DF-ZF only will have conventional armament, but its nearest relative, the Russian Avangard HGV, carries a two-megaton warhead.[38] The DF-ZF also has an antiship variant undergoing testing.[39] Sixteen DF-17s appeared at the seventieth anniversary of the PRC military parade in 2019.[40]

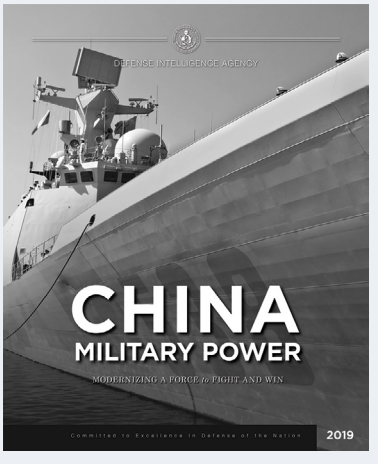
DF-21/CSS-5. China's first road-mobile, solid-fueled missile, the DF-21, is a medium-range ballistic missile with four subvariants: the DF-21A, the DF-21C, the DF-21D, and the DF-21E. The DF-21 has conventional and nuclear variants, with the nuclear variants, DF-21A and DF-21E, equipped with a 250-kiloton warhead, and there may also be an electromagnetic pulse warhead for the DF-21A.[41] The DF-21C is the conventional variant and is primarily deployed against India. The DF-21D is designed as a "carrier-killer" with greatly increased accuracy.[42] As of 2020, there are approximately forty nuclear-equipped DF-21A and DF-21E missiles and slightly more conventionally armed DF-21Cs and DF-21Ds.[43]

Both the DF-21 and DF-26 (and possibly the DF-17) are worrying, because as both have confirmed conventional and nuclear variants, there is significant ambiguity when one is launched as to what type of warhead it carries and how to counter it. As there is little visually to distinguish the variants, especially once they are launched, ascertaining the threat becomes incredibly difficult and could lead to unwarranted escalation and/or tragedy.[44]

DF-26. Another road-mobile, solid-fueled IRBM, the DF-26 is another dual-capable missile with both conventional and nuclear variants. With a range of about four thousand meters, the DF-26 is just shy of classification as an ICBM and will carry a similar 250-kiloton warhead to the DF-21. The DF-26 will likely supplant the older DF-3, with a similar range profile but greatly increased accuracy, deployment time, and the potential benefits of a dual-capable system.[45] There are roughly one hundred launchers and as many missiles for the DF-26, though the ratio of nuclear to conventional is not known.

DF-31/CSS-10. The DF-31 is a silo-based or road- and rail-mobile, solid-fueled ICBM. It is the most common ICBM in the PLARF arsenal. The ICBMs are solely nuclear-armed, with either a 250-kiloton or a one-megaton warhead. The CEP for the DF-31 is around three hundred meters, though the Chinese claim greater accuracy.[46] The subvariants are the DF-31A and the DF-31AG (sometimes called the DF-31B), both of which add MIRV capability with three-to-five twenty- to 150-kiloton warheads each. The PLARF currently possesses six DF-31 launchers, thirty-six DF-31A launchers, and thirty-six DF-31AG launchers for a total of seventy-eight missiles.[47]

DF-41/CSS-X-10. China's newest ICBM, the DF-41, is solid-fueled and has both silo and road-mobile variants, with a maximum theoretical range of fifteen thousand kilometers. The DF-41 will likely replace older ICBMs in the Chinese arsenal and will carry either a single megaton warhead or up to ten MIRV smaller warheads. The development of the DF-41 in addition to the DF-31 and older ICBMs is leading intelligence analysts to assume China's ICBM force could increase to "well over 200 [missiles]."[48] Sixteen DF-41s were present at the 2019 military parade, though there have only been unconfirmed reports of DF-41 brigades and their locations.[49]



(Figure from *Annual Report to Congress: U.S.-China Economic and Security Review Commission 2017)*

Figure 3. Chinese Theater Commands

Disposition

Overall PLA forces are divided into five theater commands, and each command has a distinct mission (see figure 3).[50] There is some confusion as to whether PLARF units in these theater commands report directly to the theater commander or are directly controlled by Chairman Xi Jinping and the Central Military Commission. Even if PLARF units are under direct control of the Chinese Communist Party, they undoubtedly have liaison and advisory relationships with the theater commands in which they share space, even if they are nominally independent of the theater command structure. For instance, PLARF units at Base 61 in the eastern Anhui Province almost certainly are fully integrated into Eastern Theater Command plans for Taiwan. There are five PLA theater commands:

- Eastern Theater Command—responsible for Taiwan, Japan, and the East China Sea
- Southern Theater Command—responsible for the South China Sea and Southeast Asia
- Western Theater Command—responsible for India, South Asia, Central Asia, and counterterrorism in Xinjiang and Tibet
- Northern Theater Command—responsible for the Korean Peninsula and Russia
- Central Theater Command—responsible for capital defense and for providing surge support to other theaters[51]

Table. People's Liberation Army Rocket Force Bases, Brigades, and Armament

Base number	Headquarters location	Brigade	Armament	Nuclear or conventional	Range	Yield	Notes
Base 61	Huangshan, Anhui Province						Eastern Theater Command area of resposibility (AOR)
	Chizhou	611	DF-21A	Nuclear	2,100+	200-300 kT	
	Jingdezhen	612	DF-21	Conventional	1,750+		Possible DF-21A, which would make it nuclear-armed
	Shangrao	613	DF-15B	Conventional	750+		
	Yong'an	614	DF-11A	Conventional	600		
	Meizhou	615	DF-11A	Conventional	600		Possibly replacing with DF-17
	Ganzhou	616	DF-15	Conventional	600		
	Jinhua	617	DF-16	Conventional	800+		
	UNK	618	UNK	UNK			Rumored new brigade base
Base 62	Kunming, Yunnan Province						Southern Theater Command AOR
	Yibin	621	DF-21	Conventional	1,750+		Possibly DF-21A, which would make it nuclear-armed
	Yuxi	622	DF-31A	Nuclear	11,200	200-300 kT	
	Liuzhou	623	CJ-10	Conventional	1,500		
	Danzhou	624	DF-21C/D	Conventional	1,750+		
	Jianshui	625	DF-26	Nuclear	4,000	200-300 kT	May still use DF-21
	Qingyuan	626	DF-26	Nuclear	4,000	200-300 kT	May still use DF-21
	Jieyang	627	DF-17	Conventional	1750+		

(Table by author; modified from Hans Kristensen and Matt Korda, "Chinese Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 6 [2020]: 449–50)

Table. People's Liberation Army Rocket Force Bases, Brigades, and Armament (continued)

Base number	Headquarters location	Brigade	Armament	Nuclear or conventional	Range	Yield	Notes
Base 63	Huaihua, Hunan Province						Southern Theater Command AOR
	Jingzhou	631	DF-5B	Nuclear	13,000	5 x 200-300 kT (MIRV)	
	Shaoyang	632	DF-31AG	Nuclear	11,200	200-300 kT	
	Huitong	633	DF-5A	Nuclear	12,000	4-5 MT	
	Tongdao	634	UNK	UNK			Possible DF-41 Brigade
	Yichun	635	CJ-10	Conventional	1,500		
	Shaoguan	636	DF-16	Conventional	800+		
	UNK	637	UNK	UNK			Rumored new brigade base
Base 64	Lanzhou, Gansu Province						Western Command AOR
	Hancheng	641	DF-31A	Nuclear	11,200	200-300 kT	
	Datong	642	DF-31AG	Nuclear	11,200	200-300 kT	
	Tianshui	643	DF-31	Nuclear	7,200	200-300 kT	
	Hanzhong	644	UNK	UNK			Possible DF-41 Brigade
	Yinchuan	645	UNK	UNK			Rumored new brigade base
	Korla	646	DF-26	Nuclear	4,000	200-300 kT	
	Xining	647	UNK	UNK			Rumored new brigade base

(Table by author; modified from Hans Kristensen and Matt Korda, "Chinese Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 6 [2020]: 449–50)

Table. People's Liberation Army Rocket Force Bases, Brigades, and Armament (continued)

Base number	Headquarters location	Brigade	Armament	Nuclear or conventional	Range	Yield	Notes
Base 65	Shenyang, Liaoning Province						Northern Command AOR
	Dalian	651	DF-21A	Nuclear	1,750+	200-300 kT	
	Tonghua	652	DF-21C	Conventional	1,750+		
	Laiwu	653	DF-21C/D	Conventional	1,750+		
	Dalian	654	DF-26	Nuclear	4,000	200-300 kT	
	Tonghua	655	UNK	UNK			Rumored new brigade base
	Laiwu/Taian	656	UNK	Nuclear			Rumored new brigade base, possible DF-31AG
Base 66	Luoyang, Henan Province						Central Command AOR
	Lingbao	661	DF-5B	Nuclear	13,000	5 x 200-300 kT (MIRV)	
	Luanchuan	662	DF-4	Nuclear	5,500	3.3 MT	Might upgrade to DF-41
	Nanyang	663	DF-31A	Nuclear	11,200	200-300 kT	
	Luoyang	664	DF-31	Nuclear	7,200	200-300 kT	Possibly upgrading to DF-31AG
	Wehui	665	UNK, probable ICBM	UNK, probably nuclear			
	Xinjang	666	DF-26	Nuclear	4,000	200-300 kT	
Base 67	Baoji, Shaanxi Province						Responsible for nuclear warhead stockpile, Western Command AOR
Total		**40 total brigades**		**20 nuclear brigades**			

(Table by author; modified from Hans Kristensen and Matt Korda, "Chinese Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 6 [2020]: 449–50)

The PLARF is divided into six "bases," sometimes referred to as armies, each corresponding to a geographic area in China. An additional element, the Jinlun (Golden Wheel) Engineering Company, is stationed in Saudi Arabia and responsible for operating missiles including the obsolete DF-3 and newer DF-21 missiles and training of the Royal Strategic Rocket Force of Saudi Arabia.[52] PLARF units are stationed at bases numbered 61 through 66; an additional base, Base 67, is where all of China's nuclear warheads are stockpiled. Chinese nuclear warheads are maintained separately from their missiles during peacetime and do not leave Base 67. As the size of support units at Base 67 has not varied much in decades, this may be an indicator that China's nuclear stockpile has not greatly increased.[53] While the PLARF itself has expanded drastically, with current personnel strength hovering around one hundred thousand, this seems to be primarily focused on the conventional arm of the PLARF and not the nuclear so far.[54]

Each base with missile units has between four and seven missile brigades. Each brigade consists of a number of battalions or independent companies armed with a specific type of missile. Brigade subordinate units are either conventionally or nuclear armed, and the size of the subordinate unit varies greatly based on armament, with some conventional missile brigades containing thirty-six launchers with six missiles each, while mobile nuclear missile brigades possess between six and twelve launchers, and silo-based nuclear missile brigades may only have six or fewer silos/caves in total with one missile per silo. Furthermore, each brigade and battalion maintains multiple supporting units for both the missiles and the launchers.[55] These supporting units include a technical battalion, a site management battalion, a communications battalion, a technical service battalion, and an electronic countermeasures battalion.[56]

As China's exact missile totals and force structure are not public knowledge, the size and disposition of some units is conjectural. What is certain is that the majority of China's missiles are short-range missiles such as the DF-11, DF-15, and CJ-10; over one thousand missiles of just these three types are aimed at Taiwan.[57] China has a total of 2,200 missiles that fall within the parameters of the now-defunct Intermediate Nuclear Forces (INF) Treaty, and those missiles make up 95 percent of China's missile inventory; almost half of these missiles are aimed directly at Taiwan.[58] The bases and the corresponding primary armament of their subordinate brigades are presented in the table (on pages 24–26).[59] Unconfirmed reports also place a DF-41 brigade in the far northwest Heilongjiang Province near the city of Daqing; if true, this could be a new brigade under Base 65, though it could also be disinformation designed to hide true DF-41 deployment.[60]

Conclusion and Recommendations

The PLARF represents a formidable force to enhance China's military objectives, and one that is very foreign to U.S. military planners, as the last U.S. ground-based missile, the Pershing II, was retired in 1987 to comply with the INF Treaty with the Soviet Union.[61] Seeing a capability gap in the forces of its two closest rivals, China seized an opportunity and has developed the largest ground-based missile force in the world. The PLARF is perhaps China's most valuable current military asset as it provides China both offensive and defensive capabilities against a wide range of opponents as well as the inherent value of deterrence that nuclear weapons provide any nation. The intentional ambiguity of armament in weapons such as the DF-21 and DF-26 enhance China's deterrence options and force adversary planners to develop a wide range of contingencies that may never be implemented. Despite these factors, there are weaknesses that U.S. planners should exploit in order to mitigate the threat posed by the PLARF.

First and foremost, China is geographically surrounded by enemies and potential enemies. Strengthening ballistic missile defenses in these nations will degrade the danger of overwhelming long-range precision fires at the onset of a conflict that the PLARF is designed to provide. Furthermore, although the PLARF is large, China does not possess vast stockpiles of missiles; in a protracted conflict, the utility of the PLARF will diminish rapidly. This is doubly true for the nuclear arm of the PLARF. China simply does not have enough nuclear missiles to warrant a nuclear exchange, though Chinese defense white papers of the last decade have stressed an "escalate to de-escalate" concept regarding nuclear employment.[62] Such a strategy would involve using a very limited number of nuclear weapons, perhaps even only a single weapon, to force an opponent into negotiations rather than devolve into a general nuclear conflagration. Given the apparent lack of tactical nuclear weapons in the

PLARF, this seems illogical. Utilizing a nuclear weapon of several hundred kiloton or higher yield will only serve to escalate a conflict, and those are the preponderance of Chinese nuclear warheads.

Any U.S. military plan, whether on the Korean Peninsula, Taiwan, the South China Sea, or elsewhere, must factor the PLARF in its calculations. U.S. Army nuclear and counter-weapons of mass destruction officers would be invaluable at the operational level in the event of a conflict with a nuclear power such as China. Although typically assigned at the strategic level, these officers possess intimate knowledge of nuclear targeting and damage assessment that would greatly enhance the situational awareness of operational commanders. They would be able to assist operational Army commanders in preparing to operate in a nuclear environment and reacting to dual-use weapons.

Joint planners should refer to the Department of Defense's *Deterrence Operations Joint Operating Concept* and the 2018 *Nuclear Posture Review*, which both provide guidance on how to counter an adversary's nuclear and dual-capable forces.[63] Plans must integrate robust air and missile defense options at all levels to protect the force and degrade Chinese deterrence. U.S. home-based strategic missile defense is planned to increase from forty-four ground-based interceptors to sixty-four within the next ten years, while tactical and operational-level Patriot, Terminal High-Altitude Air Defense, and Aegis SM-3 air defense systems are receiving upgrades and will be procured in greater numbers per the *2019 Missile Defense Review*.[64] Protection will also be vitally important for mission command and logistics nodes, necessitating robust construction engineer units to harden these locations and electronic warfare units to conceal locations. Commanders should use intelligence, surveillance, and reconnaissance (ISR) capabilities to identify PLARF assets and use either special operations forces or long-range precision fires, either integral or air support, to neutralize the threat these missile systems pose. ISR can also identify if a PLARF unit is a conventional or nuclear unit to permit the commander to react accordingly; the United States and Russia demonstrated technology using neutron detectors on helicopters to find nuclear weapons as early as the 1980s, and these could be modified for use in current ISR assets.[65] Finally, deception operations to fool Chinese targeters into striking false targets will yield immense benefits, because as noted above, the PLARF has a very limited reserve of missiles to draw from, and thus every wasted missile offers significant ability to degrade PLARF capabilities.

By fully integrating enablers, Army and joint commanders can mitigate the risk posed by PLARF units in the event of a conflict. The PLARF is a formidable but not invincible element of the Chinese military. As China continues to flex its muscles regionally, the United States must, at the strategic level, counter malign influences and strengthen legitimate ties. Should strategic deterrence fail and the United States enter into open conflict with China, combatant commanders must be prepared to counter the force-multiplying nature of the PLARF to ensure success in the operating environment. ■

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